

ABSTRACT OF THE DISCLOSURE

Non-volatile memory that has non-volatile charge storing capability such as EEPROM and flash EEPROM is programmed by a programming system that applies to a plurality of memory cells in parallel. Enhanced performance is achieved by programming each cell to its target state with a minimum of programming pulses using a data-dependent programming voltage. Further improvement is accomplished by performing the programming operation in multiphase where each successive phase is executed with a finer programming resolution such as employing a programming voltage with a gentler staircase waveform. These features allow rapid and accurate convergence to the target states for the group of memory cells being programmed in parallel, thereby allowing each cell to store several bits of information without sacrificing performance.